

CLAIMS

I claim:

1. A system for removing floating and non-floating particulate material from a stream of water, said system comprising:

a separation tank for treating a flowing stream of water, said separation tank comprising an outer chamber having an interior surface, an inner chamber having an interior surface positioned within said outer chamber, an inlet in said outer chamber adapted to receive the water to be treated, an outlet in said outer chamber adapted to discharge the treated water, said inner chamber having an inlet opening and an outlet opening; said inlet opening being aligned with said inlet whereby water entering said inlet passes through said inlet opening to enter said inner chamber generally at a tangent to the interior surface of said inner chamber and passes out of said inner chamber through said outlet opening to enter said outer chamber, and a baffle plate located intermediate said outlet opening in said inner chamber and said outlet in said outer chamber, said baffle plate having a baffle opening formed therein such that water passes to said outlet in said outer chamber through said baffle opening, said baffle opening being located at a predetermined vertical location within said separation tank, said inlet opening being sized to allow a maximum flow therethrough such that a high flow of water exceeding that maximum flow will be prevented from entering said inner chamber, said high flow of water thereafter being directed to pass through said baffle plate and to be discharged through said outlet in said outer chamber.

2. A separation tank for treating a flowing stream of water, said separation tank comprising:

an outer chamber;

an inner chamber having an interior surface positioned within said outer chamber;

an inlet in said outer chamber adapted to receive the water to be treated;

an outlet in said outer chamber adapted to discharge the treated water;

said inner chamber having an inlet opening and an outlet opening;

said inlet opening being aligned with said inlet to direct water entering said inlet to pass through said inlet opening and enter said inner chamber so as to create a

vortex swirling action of the water along the interior surface of the inner chamber and to pass out of said inner chamber through said outlet opening, and

a baffle plate located intermediate said outlet opening in said inner chamber and said outlet in said outer chamber, said baffle plate having an opening therethrough through which water passes to said outlet in said outer chamber, said baffle plate having a baffle opening formed therein at a predetermined vertical location within said separation tank

3. The separation tank of claim 2 wherein said outer chamber is a cylindrical chamber having an interior cylindrical surface.

4. The separation tank of claim 2 wherein said inner chamber is a cylindrical chamber having an interior cylindrical surface.

5. The separation tank of claim 2 wherein said separation tank has a floor and wherein said inner chamber and said outer chamber are positioned on said floor.

6. The separation tank of claim 3 wherein the water passing out of said outlet opening in said inner chamber moves generally at a tangent to the internal surface of said cylindrical outer chamber.

7. The separation tank of claim 4 wherein the water entering said inner chamber strikes the interior cylindrical surface at a tangent to the internal surface of said cylindrical outer chamber.

8. The separation tank of claim 2 wherein said inlet in said outer chamber is generally horizontally aligned with said inlet opening in said inner chamber.

9. The separation tank of claim 5 wherein said outlet opening in said inner chamber is located below said inlet opening but above said floor.

10. The separation tank of claim 3 wherein said baffle plate is an arcuate plate having opposite ends affixed to the inner cylindrical surface of said outer chamber.

11. The separation tank of claim 2 wherein said inlet opening and said outlet opening are substantially rectangular shapes.

12. The separation tank of claim 2 wherein said baffle opening in said baffle plate is positioned below the vertical position of said outlet in said outer chamber.

13. The separation tank of claim 2 wherein said inner chamber is formed as a cylindrical wall and said outer chamber is formed as a cylindrical wall and wherein said cylindrical wall of said inner chamber is positioned so as to touch or be in close proximity to said cylindrical wall of said outer chamber.

14. A method of separating floatable and non-floatable material from a stream of water by means of a separation tank, said method comprising the steps of:

providing an outer chamber having an interior surface and having inlet adapted to receive a stream of water to be treated and an outlet for discharging treated water passing through the separation tank;

providing an inner chamber located within the outer chamber, the inner chamber having an interior surface, an inlet opening and an outlet opening located vertically lower than the inlet opening;

directing the stream of water received by the inlet through the inlet opening so as to contact the interior surface of the inner chamber to form a vortex swirling path around the inner chamber to progress downwardly to pass through the outlet opening;

passing the water from the outlet opening over and under a weir to trap floatable and non-floatable materials in the water;

discharging the water outwardly from the outlet.

15. The method of claim 14 wherein the step of providing an inner chamber having an interior surface comprises providing an inner chamber having an arcuate inner surface.

16. The method of claim 15 wherein the step of providing an inner chamber having an interior surface comprises providing an inner chamber having a cylindrical inner surface.

17. The method of claim 14 wherein the step of passing the water over and under a weir comprises providing a baffle plate having a baffle opening located intermediate the inner chamber and the outlet forming upper and lower weirs.

18. The method of claim 17 wherein the step of providing a baffle plate comprises providing an arcuate baffle plate affixed to the interior surface of the outer chamber to isolate the outlet such that all of the water passes through the baffle opening before reaching the outlet.

19. The method of claim 14 wherein the step of directing the steam of water further comprises separating out non-floatable materials from the stream of water passing through the inner chamber and collecting those materials at the bottom of the inner chamber.

20. A system for removing floating and non-floating particulate material from a stream of water, said system comprising:

a separation tank for treating a flowing stream of water, said separation tank comprising an outer chamber having an interior surface, an inner chamber having an interior surface positioned within said outer chamber, an inlet in said outer chamber adapted to receive the water to be treated, an outlet in said outer chamber adapted to discharge the treated water, said inner chamber having an inlet opening and an outlet opening; said inlet opening being aligned with said inlet whereby water entering said inlet passes through said inlet opening to enter said inner chamber generally at a tangent to the interior surface of said inner chamber and passes out of said inner chamber through said outlet opening to enter said outer chamber, and a baffle plate located intermediate said outlet opening in said inner chamber and said outlet in said outer chamber, said baffle plate having a baffle opening formed therein such that water passes to said outlet in said outer chamber through said baffle opening, said baffle opening being located at a predetermined vertical location within said separation tank, said inlet opening being sized to allow a maximum flow therethrough

such that a flow of water exceeding that maximum flow will be prevented from entering said inner chamber.

21. The system as defined in claim 20 wherein said interior surface of said inner chamber is an arcuate surface.

22. The system as defined in claim 21 wherein said interior surface of said inner chamber is cylindrical.

23. The system as defined in claim 20 wherein said flow of water prevented from entering said inner chamber flows through said baffle opening before flowing to said outlet.

24. The system of claim 20 wherein said interior surface of said outer chamber is an arcuate surface and said flow of water prevented from entering said inner chamber is directed at a tangent to the interior arcuate surface of said outer chamber.

25. The system of claim 24 wherein said arcuate surface is cylindrical.

26. The system of claim 20 wherein said baffle opening creates an upper weir and a lower weir to separate both floatable and non-floatable material from the flow of water discharged through said outlet.

27. The system of claim 20 wherein said baffle opening is located vertically below said outlet in said outer chamber.

28. The system of claim 27 wherein said baffle opening is located vertically above said outlet opening in said inner chamber.